REMARKS

Applicant thanks the Examiner for the thorough review and consideration of the pending application. Applicant has received and carefully reviewed the Office Action dated December 17, 2007. Applicant also thanks the Examiner for meeting with Applicant's representative on March 14, 2008. The substance of that meeting is reflected in the comments below.

No claims are amended. Claim 4 was previously withdrawn. Accordingly, claims 1- 4 are pending for prosecution on the merits, with claim 4 withdrawn from consideration.

APPLICANT'S COMMENTS IN REPLY TO THE OFFICE'S
RESPONSE TO APPLICANT'S ARGUMENTS FILED ON OCTOBER 5, 2007

Applicant respectfully believes that the Office misunderstands the teachings of *Whipple*. This belief is based, at least in part, on assertions and explanations made by the Office in its "Response to Arguments" section of the Office Action mailed on October 17, 2007. Applicant encourages the Office to review *Whipple* in depth and to consider the following comments.

Applicant respectfully suggests that the easiest way for the Office to understand why *Whipple* does not describe, teach, or suggest, comparing real-time measurements to a reference value is to consider *Whipple's* description of an embodiment of a sensor for measuring phase angle difference between the phases of the voltage and current of a motor. *See Whipple* at col. 7, ll. 30-54. *Whipple's* sensor is described as follows:
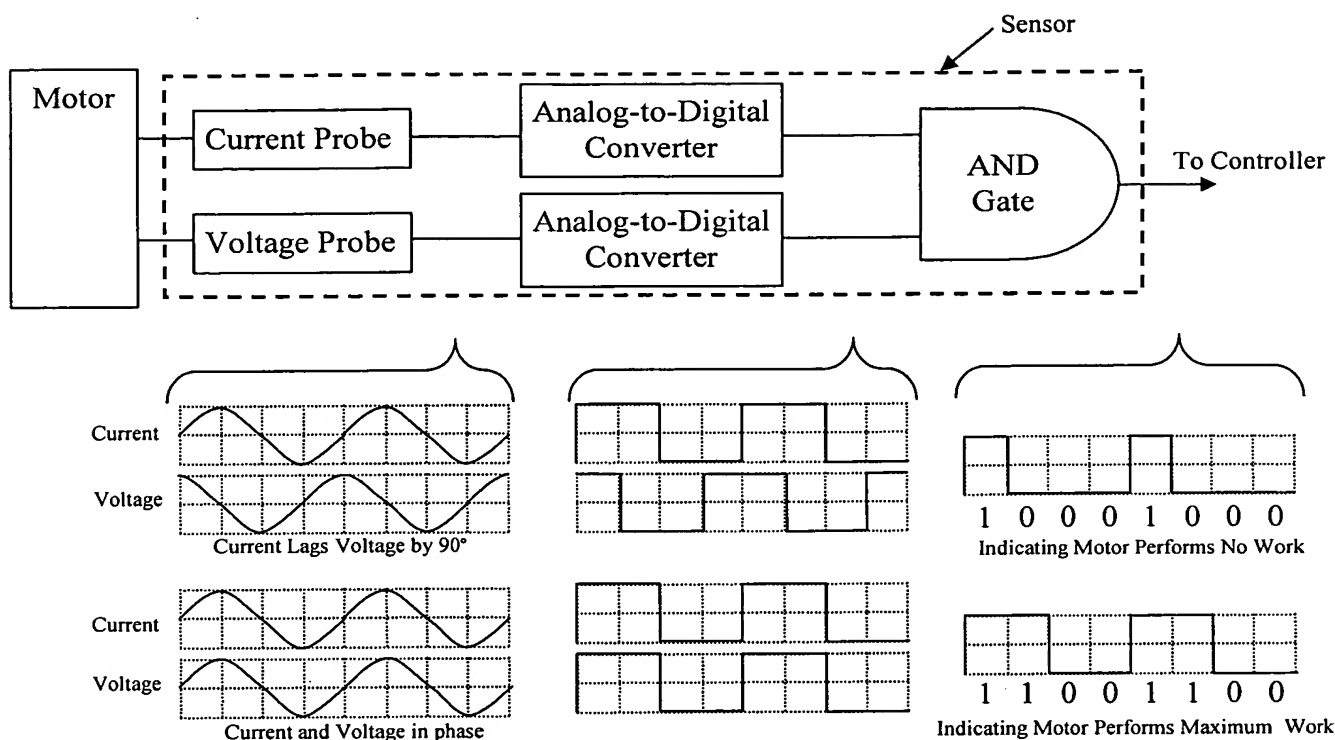
> One embodiment of such a sensor for measuring the phase angle difference comprises a voltage probe coupled to motor 75 to measure voltage and a Tektronix current probe coupled to motor 75 to measure current. In the embodiment of the sensor for measuring phase angle difference including a voltage probe and a current probe, the signal from each respective probe is separately provided to an electronic circuit, such as a conventional comparator or an operational amplifier, for providing a digital output signal, such as a positive step signal, when the particular signal, such as the alternating current or alternating voltage, has a positive voltage. Likewise, another digital output signal, such as a negative voltage or ground, is provided when the particular signal has a negative voltage. Both respective comparator or operational amplifier output signals are then simultaneously provided to another electronic circuit, such as a conventional flip-flop or an AND function gate, to provide a digital output signal to indicate the duration in which both comparator or operational amplifier output signals have a positive voltage. This duration provides a measurement of the phase angle difference between the current and voltage of motor 75.

Whipple at col. 7, ll. 30-54.

By way of explanation, *Whipple's* sensor comprises a voltage probe coupled to the motor and a current probe coupled to the motor. The output of each probe is connected to separate circuits that convert the analog voltage signal of each respective probe to a digital signal. (As will be understood by the Office, the output of a voltage probe is a <u>voltage</u> that is proportional to the measured voltage. Likewise, the output of a current probe is a <u>voltage</u> that is proportional to the measured current.) The analog-to-digital circuits can be comparator or operational amplifier circuits, as described by *Whipple. See id.*

Whipple provides a written example to describe the outputs of the analog-to-digital circuits. Applicant presents, hereinbelow, as a courtesy to the Office, illustrations to help the Office understand *Whipple's* sensor and the input and output waveforms of that sensor.

Whipple states that when the analog voltage output of the either the voltage probe or the current probe is positive, the output of the respective probe's analog-to-digital circuit is a positive voltage. Likewise, when the analog voltage output of the either the voltage probe or the current probe is negative, the output of the respective probe's analog-to-digital circuit is ground (or alternatively could be a negative voltage). *Whipple* states that the output signals of the analog-to-digital circuits are <u>digital</u>. Thus, they can be represented as a logic "1" or a logic "0" in Boolean logic. *Whipple* also states: "Both respective comparator or operational amplifier [(i.e., analog-to-digital circuit)] output signals are then <u>simultaneously</u> provided to another electronic circuit, such as a conventional flip-flop or an AND function gate." *Id.* at col. 7, ll. 45-49 (emphasis added). For the convenience of the Office, the circuit described by *Whipple* is shown below in block form with an AND function gate as the last element:

Sensor

| Motor | Current Probe | Analog-to-Digital Converter | AND Gate | To Controller |

| Voltage Probe | Analog-to-Digital Converter |

Current

Voltage

Current Lags Voltage by 90°

1 0 0 0 1 0 0 0

Indicating Motor Performs No Work

Current

Voltage

Current and Voltage in phase

1 1 0 0 1 1 0 0

Indicating Motor Performs Maximum Work

For an ideal electric motor operating with alternating current, when the motor has no load across it or when the motor performs substantially no work, the alternating current of the motor should lag the alternating voltage of the motor by a phase angle difference approaching 90°. Likewise, when the motor is performing its maximum amount of work, such as when it is operating at full design capacity, the current of the motor and the voltage of the motor should be substantially in phase.

Id. at col. 7, ll. 3-13. As shown in the illustrations above, *Whipple's* "sensor for measuring phase angle difference between the phases of the voltage and current of the motor" has an output (far right side of illustration) that represents, for example, a first digital word when the motor is performing no work and a second digital word, different from the first, when the motor is performing its maximum amount of work. *See id.*

The Office should readily see that in *Whipple's* design, there is no need to compare the output of the sensor to any reference value. *Whipple's* sensor's digital output is connected to the input of *Whipple's* controller. When the output of the sensor corresponds to a first digital word, there is no load on the motor (i.e., the power consumption surges have dampened out). When the output of the sensor corresponds to a second digital word, different from the first, there is a maximum load on the motor. To the extent that a digital output of a sensor, as described above, could read on a value indicative of a determined electrical characteristic of a

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motor, *Whipple's* controller determines which of two words are being output by the sensor without any need of "comparing the value indicative of the determined electrical characteristic with a reference value," as recited in independent claim 1.

The same conclusion results for each embodiment of *Whipple's* sensor 60. For the tachometer based sensor of FIG. 3, when the indicated speed is not changing (i.e., is constant), there is no load on the motor (i.e., the power consumption surges have dampened out) and the sensor's output would represent a first word. When the indicated speed is changing, there is a load on the motor and the sensor's output would represent a second word, different from the first. To the extent that a digital output of a tachometer, as described above, could read on a value indicative of a determined electrical characteristic of a motor, *Whipple's* controller determines which of two words were being output by the sensor without any need of "comparing the value indicative of the determined electrical characteristic with a reference value," as recited in independent claim 1.

For the sensor that detects power consumption surges as illustrated in FIG. 4, when the peak current or the root-mean-square value of the current of the motor is not changing (i.e., is constant), there is no load on the motor (i.e., the power consumption surges have dampened out) and the sensor's output would represent a first word. When the peak current or the root-mean square value of the current of the motor continues to change, there is a load on the motor and the sensor's output would represent a second word, different from the first. To the extent that a digital output of the circuit of FIG. 4, as described above, could read on a value indicative of a determined electrical characteristic of a motor, *Whipple's* controller determines which of two words were being output by the sensor without any need of "comparing the value indicative of the determined electrical characteristic with a reference value," as recited in independent claim 1.

For the sensor that detects instantaneous power of the motor, as illustrated in FIG. 5, while the instantaneous power of the motor is not changing (i.e., is constant), there is no load on the motor (i.e., the power consumption surges have dampened out) and the sensor's output would represent a first word. When the instantaneous power of the motor continues to change, there is a load on the motor and the sensor's output would represent a second word, different from the first. To the extent that a digital output of the power meter of FIG. 5, as described above, could read on a value indicative of a determined electrical characteristic of a motor,

Whipple's controller determines which of two words were being output by the sensor <u>without</u> <u>any need</u> of "comparing the value indicative of the determined electrical characteristic with a reference value," as recited in independent claim 1.

As previously stated, *Whipple* <u>has no need</u> of "comparing the value indicative of the determined electrical characteristic with a reference value," to practice his invention. Moreover, despite the Office's assertions to the contrary, *Whipple* fails to describe, either expressly or inherently, "comparing the value indicative of the determined electrical characteristic with a reference value," as recited in independent claim 1. For at least the above stated reasons, the 35 USC § 102(b) rejection of independent claim 1 and dependent claims 2 and 3 should be withdrawn.

Applicant further, and respectfully, wishes to address certain statements made by the Office in its Response to Applicant's Arguments. First, Applicant wishes to address the Office's response at ¶ 2 of the Office Action. In its response, the Office attempts to explain its rationale for asserting anticipation, essentially as follows: 1) *Whipple* uses a microprocessor in conjunction with a computer program; 2) microprocessors include memory; 3) *Whipple's* controller can be an ASIC; and 4) ASICs are known to include both processors and memory. Thus, the Office reasons, *Whipple* "anticipated the use of data storage." Office Action at ¶ 2. (Note: Applicant does not claim "the use of data storage.") The Office then makes the following jump to an illogical conclusion: Because *Whipple* anticipated the use of data storage, *Whipple* must anticipate "comparing the value indicative of the determined electrical characteristic with a reference value," as recited in independent claim 1. This conclusion is in error. The Office's logic simply makes no sense.

As the Office should understand, at least from the discussion of *Whipple's* sensors above, *Whipple* <u>has no need</u> to, and <u>does not</u>, describe, teach, or suggest the comparison of *any* value to *any* reference value. Thus, Applicant maintains, as explained in more detail below, that the Office is erroneously *reading a great deal into Whipple*.

Second, in its response to Applicant's arguments, the Office makes the following misstatement: "Figure 2 of *Whipple* exemplifies the controller's logic." Office Action at ¶ 3. Applicant respectfully disagrees. FIG. 2 of *Whipple* has <u>absolutely nothing to do</u> with *Whipple's* controller's logic. The Office mistakenly believes that FIG. 2 is meant to illustrate some type of "threshold level," above which liquid flows and below which liquid does not.

That belief is entirely incorrect. *Whipple* provides FIG. 2 simply to illustrate that the phase angle difference between motor voltage and current changes (increases and decreases) as a function of time. Eventually the changes substantially dampen or stop. *Whipple* never indicates that the illustrated phase angle difference is an output of any of his sensors. In fact, and in stark contrast to the illustration of *Whipple's* FIG. 2, the output of his sensors are <u>digital</u> in form. *Whipple* at col. 7, ll. 30-54. The Office will please note that FIG. 2 is <u>not</u> illustrated as a digital waveform; it is not even illustrated as an analog voltage waveform. FIG. 2 is illustrated in units of degrees. The illustration is present to help readers visualize how the phase difference (in degrees), between motor voltage and motor current, changes with time, nothing more.

Third, *Whipple* states that "FIG. 2 is a plot of the magnitude of the difference in phase angle between motor current and motor voltage versus time for an embodiment of the invention illustrated in FIG. 1." *Id.* at col. 2, ll.55-58. Please note that *Whipple* <u>never states or indicates in any way</u> that FIG. 2 illustrates the output of the "device monitoring the machine load" (i.e., *Whipple's* sensor 60, FIG. 1). Moreover, please note that *Whipple* <u>never states or indicates in any way</u> that FIG. 2 illustrates a waveform applied to the controller 200 (of FIG. 1). Please also please especially note that *Whipple* <u>never states or indicates in any way</u> that FIG. 2 exemplifies the controller's logic. Quite plainly, FIG. 2 is presented to aide the reader in visualizing how the phase difference (in degrees) between motor voltage and motor current, changes with time. Respectfully, the Office's assertion, that "Figure 2 of *Whipple* exemplifies the controller's logic," at best represents a misunderstanding of the teaching of *Whipple* and at worst represents a misstatement based on the Office's imagination.

Fourth the Examiner posed the following question to Applicant: "How would the controller *know* when the power consumption surges have dampened out if it was not comparing the real-time assessed values to previously recorded or determined values?" Office Action at ¶ 3 (emphasis in original). Applicant respectfully answers that as discussed and illustrated above, the circuitry of *Whipple* does not rely on comparing a real-time value to a previously recorded value. The sensor of *Whipple* uses real-time measurements of the phase difference between voltage and current waveforms of the motor to cause the sensor's output to generate digital words which represent whether the motor is operating at full load or no load. If the controller reads a first word, then there is no load on the motor, or in other words, the

power consumption surges have dampened out. If the controller reads a second word, then there is a load on the motor, or in other words, the power consumption surges have not dampened out. *Whipple's* controller determines, based on the digital word stream output from the sensor, when the power consumption surges have dampened out. That is how *Whipple's* controller *knows*.

Fifth, the Office asserts that "*Whipple* even states that the slope of the average signal is used to determine the end of motor surge." Office Action at ¶ 3 (citing *Whipple* at col. 6, ll. 61-64). Applicant presents the entire passage, including the portion cited by the Office, for the convenience of the Office:

> As described, a fuzzy logic controller may be used to control the amount of water to be provided to a machine for washing articles. One may determine when the machine has sufficient water by sensing the end of oscillations or surges in the power consumption of the motor. Several methods for sensing when the motor has ceased to surge are by measuring the pump motor current, pump motor current/voltage phase angle difference, motor speed, power and water pressure. Thus, a signal is available for determining when the pump motor has ceased to surge. In a method for using the features of this signal, the amplitude of oscillation and slope of the average signal is used to determine the end of motor surge. A third variable, elapsed time, is also used to ensure that the water is not shut off prematurely due to system noise very early in the fill operation.

Whipple at col. 6, ll. 51-66. When *Whipple* states that "the amplitude of oscillation and slope of the average signal is used to determine the end of motor surge," he is merely noting, for example, that his disclosed circuits make use of the amplitude value, <u>logic high or logic low</u>, of the sensor output, as well as the slope (i.e., positive going or negative going) of the sensor output signal. This is evident when considering that *Whipple* relies on <u>digital</u> signals, which have a <u>fixed amplitude</u> (e.g., TTL=5 volts for a logic "1" and 0 volts for a logic "0") and either positive going (i.e., positive slope) or negative going (i.e., negative slope) edges. The Office should find support for Applicant's explanation from at least the following passage relating to the signals of *Whipple's* sensor:

> In the embodiment of the sensor for measuring phase angle difference including a voltage probe and a current probe, the signal from each respective probe is separately provided to an electronic circuit, such as a conventional comparator or an operational amplifier, for providing a <u>digital output signal</u>, such as a <u>positive step signal</u>, when the particular signal, such as the alternating current or alternating voltage, has a <u>positive</u>

voltage. Likewise, another <u>digital output signal</u>, such as a <u>negative voltage or ground</u>, is provided when the particular signal has a <u>negative voltage</u>.

Whipple at col. 7, ll. 35-45 (emphasis added).

Sixth, the Office argues: "*Whipple* even states that measurements can be taken several times per second. Therefore many of these periods occur each second." Office Action at ¶ 3. For the convenience of the Office, Applicant repeats that portion of *Whipple*, which Applicant believes the Office is citing:

> A closed loop feedback control algorithm, such as the fuzzy logic feedback control algorithm disclosed in aforesaid patent application Ser. No. 07/877,301 (RD-22,082), may provide periodic, or discrete-time, closed loop feedback control for the system for washing or cleansing articles or it may provide continuous closed loop feedback control. In periodic feedback control, the closed loop feedback control system may incorporate, in real-time, sequences of measurements, such as several measurements per second, provided by the device for monitoring machine load.

Whipple at col. 5, l. 60 - col. 6, l. 2. Applicant respectfully states that *Whipple* is describing a closed loop, periodic, or discrete-time feedback control. In this type of feedback control, several measurements can be taken per second. Respectfully, Applicant does not understand the point the Office is trying to make with its above-recited statement. To Applicant's best understanding, the statement has nothing to do with, at least, "comparing the value indicative of the determined electrical characteristic with a reference value," as recited in independent claim 1.

CLAIM REJECTIONS

The Office rejects claims 1 and 3 under 35 U.S.C. § 102(b) as being anticipated over U.S. Patent No. 5,330,580 to *Whipple* (hereinafter "*Whipple*"). Office Action at ¶ 5. Applicant respectfully traverses the rejection and asserts that *Whipple* fails to disclose a method comprising, at least, "comparing the value indicative of the determined electrical characteristic with a reference value," as recited in independent claim 1.

As explained above, *Whipple* entirely fails to describe, either expressly or inherently, "comparing the value indicative of the determined electrical characteristic with a reference value," as recited in independent claim 1. *Whipple* simply determines, without any need to make comparisons, when changes in the real-time measurements substantially dampen or stop. The Office incorrectly presumes that the determination made by *Whipple's* controller requires a comparison to a previous measurement or predetermined value. Comparisons to previous

voltage. Likewise, another <u>digital output signal</u>, such as a <u>negative voltage or ground</u>, is provided when the particular signal has a <u>negative voltage</u>.

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measurements or predetermined values are not needed for the types of circuitry and measurements described by *Whipple*.

Whipple relates to a machine that "incorporates a device for measuring machine load that includes a sensor for detecting power consumption surges." *Whipple* at Abstract. *Whipple* discloses that, "by sensing when oscillations or surges in power consumption of motor 75 have substantially dampened out or ceased, the appropriate time to no longer provide liquid...has been provided." *Id.* at col. 7, ll. 19-30; *see also id.* at FIG. 2. The Office's statements and conclusions about *Whipple's* apparatus and methodology are, respectfully, wrong.

Accordingly, for at least these reasons, Applicant asserts that claim 1 is allowable over *Whipple*. Claim 3, which depends from claim 1, is also allowable for at least the same reasons. Applicant, therefore, respectfully requests withdrawal of the 35 U.S.C. § 102(b) rejection of claims 1 and 3.

The Office rejects claim 2 under 35 U.S.C. § 103(a) as being obvious over *Whipple* in view of U.S. Patent No. 4,509,543 to Livingston *et al.* (hereinafter "*Livingston*") or U.S. Patent No. 4,245,310 to Kiefer (hereinafter "*Kiefer*"). Office Action at ¶ 7. Applicant respectfully traverses the rejection.

Claim 2 depends from claim 1 and, as stated above, *Whipple* does not disclose at least a method comprising, "comparing the value indicative of the determined electrical characteristic with a reference value" as recited in independent claim 1.

Neither *Livingston* nor *Kiefer* cure the deficiencies of *Whipple*. In fact, both *Livingston* and *Kiefer* were cited to support an alleged disclosure of the use of error messages. Therefore, claim 2, which depends from claim 1, is patentable over the combination of *Whipple* in view of *Livingston* or *Kiefer*. Accordingly, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103(a) rejection of claim 2.
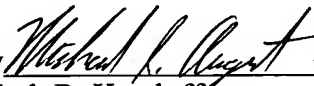
CONCLUSION

This application is in condition for allowance. If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at (202) 496-7500 to discuss the steps necessary for placing the application

in condition for allowance. All correspondence should continue to be sent to the below-listed address.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. §1.136, and any additional fees required under 37 C.F.R. § 1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 50-0911. Please credit any overpayment to deposit Account No. 50-0911.

Dated: <u>May 19, 2008</u>   Respectfully submitted,

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